2002 Ocean Exploration Initiative

Theme:
Ocean Frontiers -- Submarine Canyons

Dinosaurs once roamed the edge of the continental shelf. Their beach front property is now under hundreds of meters of seawater along the edge of the shelf. Off the edge of the shelf, the seafloor steepens as the continental slope drops away to the deep sea. When the shelf was dry and the slope was the coast, rivers cut through the shelf edge and exited on the slope. All along the shelf edge and upper slopes of the world, submarine canyons mark these ancient river beds. In other areas of the world, faulting and folding of the earth surface create canyons and rifts. These are the deepest spots on earth. Canyons like the Hudson Canyon off New York, Hatteras Canyon off North Carolina and Monterey Canyon off California are examples of different types of canyons in terms of how they formed, by erosion or faulting. They are all the same, however, in that they support more life than surrounding slope. They have steep walls that fold and crack creating holes and nooks for small animals. They funnel and concentrate organic matter down their axes. Rocks and cliffs provide perches for attached species such as corals and sponges that add to the habitat value of canyons. Like coral reefs in the shallows, these deep canyons are where fish live and the diversity of deep sea life is greatest.

Line Offices:
- OAR, NOS

Objectives:
- map canyon walls and floor
- describe geology of canyon walls and floor
- determine the vertical distribution of canyon biota
- relate biota to geology and habitats
- determine the flux rate of materials down canyon axis
- correlate biota with depocenters and material fluxes

Strategies:
- Develop RFP in conjunction with NMFS
- Conduct a peer review to determine best science and target locations
- Projects should include: assessment of existing data on bathymetry, biology and geology of target site, current resources that may target canyon habitats, and research to address priority objectives
- 3 year field program and 2 years of data analysis and publication costs
- seek partnerships with education programs to feature research in education and outreach media and activities, e.g., Hudson Canyon Exploration program with Columbia Univ.

Special Technologies:
- NOS and USGS- mapping data
- OAR/NURP- submersibles for ground-truth of towed mapping technologies, and fine scale geochemical samples and studies, biological and geological sampling of canyon walls and floor
- NMFS- fish data

Benefits:
- exploring the unknown, in particular species diversity of the deep ocean
- deep water habitats are critical to many commercially valuable fisheries, such as lobster and tilefish on northeast US coast
- more accurate models of carbon flux in the ocean
- outreach value of linking remote frontiers to the classroom

Budget:
2002 – $1.5 million
2003 – $1.5 million
2004 – $1.5 million
2005 – $300,000
2006 – $300,000